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The photograph was taken without an eyepiece, the magnifying power being obtained by distance; owing to the moderate angle of the objective the picture was freer from diffraction fringes and consequently handsomer than any *Amphipleura* picture I had previously obtained, for this reason only it was selected for reproduction. Since it has been in the hands of the printer, however, it is only fair to say that I have obtained equally beautiful pictures with the same power by an objective made by Tolles of 140° angle, as well as by an objective of Powell and Lealand, both used without eyepieces. Copies of these pictures I have sent to the Editor of the department of microscopy of this journal for exhibition. I suspect each maker would claim that the picture by his objective was the best. For myself I regard them as nearly equally good, and think that to discriminate slight shades of excellence between objectives of this high grade, it is necessary either to give a much higher power, by distance or eyepiece, or else to use some more subtle test, such for example as the finer bands of the Nobert's plate.

My present object is not to advocate one maker or another, but to present an image of what the best glasses of several excellent makers will do with ease if properly handled, and to those who are influenced by more partisan feelings I need only suggest that less than two years ago no American microscopist had been able to see any striæ on this well marked diatom, and that those who had made the attempt were disposed to regard the observations of the Hull naturalists, made over ten years before, as quite fictitious.

In conclusion I need only mention that the illustrative print was reproduced from my negative by "The American Photo-relief Printing Company" No. 1002 Arch Steet, Philadelphia, Pa.

WHAT IS TRUE TACONIC?

BY PROF. JAMES D. DANA.

THE true use of the term Taconic should be learned from Prof. Emmons's first application of it when he made his formal announcement of the "Taconic system." In his final New York

Geological Report, 4to., 1842, the rocks so-called are those of the Taconic mountains, on the borders of Massachusetts and New York, together with the quartzite, limestone, and slates adjoining on the east,* and not the slates far west of these mountains;† moreover the slates, the rocks of the mountain, were the typical beds, and not the quartzite. Hence, if there are any Taconic schists or slates, those of the Taconic range are the rocks entitled to bear the name, being Taconic geographically, and Taconic by the earliest authoritative use, Prof. Emmons the authority.

Prof. Emmons, in his Agricultural Report, subsequently published (in 1843), announced the Primordial beds of Bald Mt. (near Canaan Four Corners, in Columbia Co. N. Y.), as *Taconic* also; but this did not make them so. He referred to the Taconic the Black slates of northern Vermont, since shown to contain primordial fossils; he searched the country north and south for other Taconic rocks, and found them as he thought; and he set others on the search, not only in this country, but over the world. But all this has not changed the fact that the true Taconic beds, if any are such, are those he first so announced; and that the rest, so far as they are of different age from these, younger or older, have been dragged into the association without reason. The Taconic rocks of Berkshire and of the counties of New York just west always bore the most prominent part in his later descriptions of the Taconic system.

The error on the part of Prof. Emmons, in referring beds of other ages to the Taconic system, is not surprising considering the difficulties in the case. But it was no less an error; and his name as a backer cannot make the wrong right.

* Professor Emmons opens the subject of the "Taconic System" in his final Report (1842) by saying that it extends north through Vermont to Quebec, and south into Connecticut; but the only rocks he describes as the rocks of the system are those of Berkshire County, Massachusetts, and their continuation westward into New York. These are the typical rocks on which the system was founded. On plate xi. four figures representing sections across this particular region are given. The only Vermont observations are contained in the only other section on the same plate representing a section from Lake Champlain to Richmond, Vt., through Charlotte. No description of the rocks of this section is to be found in the text of the volume.

† In figure 4 of plate xi (referred to in the preceding note) representing a section through Graylock, the "Taconic slate" stops just west of Berlin, Rensselaer County, New York, the slates on the west being put down as "Hudson River shales," and in figs. 2 and 3, the boundary is near Petersburg, north of Berlin. The extension of the Taconic to the Hudson River appears first in Prof. Emmons's Agricultural Report, published in 1843.

Geologists now regard the slates of Taconic Mt. and the limestone, also, as of Lower Silurian age, but later than the Potsdam sandstone. Logan refers them to the Quebec group. Whatever the period of the slates, or slates and associated limestones, to that period properly pertains the term *Taconic*.

THE STONE AGE IN NEW JERSEY.

[Concluded from March Number, p. 160.]

BY CHARLES G. ABBOTT, M.D.

ARROWHEADS. — No one class of relics of a savage race presents at once so great a variety of shapes, sizes and materials; and the former presence of "Indians," is more generally known to the people at large through the frequent occurrence of these arrow-points, than by means of any other style of weapon or implement; not even excepting the cumbrous axes that not unfrequently go to make up the piles of cobblestones that accumulate in field corners or by the roadside. One of the largest axes we have seen, which we have since sent to Sir John Lubbock, was found supporting a section of worm-fence, where it had been lying thus for at least a century.

These arrowheads, which are found scattered over every portion of the state, are, very naturally, much more numerous in some localities than in others; and as no one style appears to be peculiar to any one locality, a good series from even a very limited extent of country will usually represent the shapes and sizes found over the whole state. Any attempt at classification will prove a desperate undertaking, as no well marked style has yet been found which has not been duplicated by a second, varying a mere trace, and these slight variations go on without a break until the two extremes of shape are found to be connected by an unbroken chain of closely allied varieties. The Darwinism of arrowheads needs no supplemental theory to make it good, nor are there shapes that cannot be explained by a somewhat similar and more primitive one. Prof. Nilsson ("Stone Age in Scandinavia," Eng. ed., page 43) says "we may divide arrowheads into such as have,